WHAT IS CLAIMED IS:

1. A light-emitting device, comprising:

a multi-layer stack of materials including a light-generating region and a first layer supported by the light-generating region, a surface of the first layer being configured so that light generated by the light-generating region can emerge from the light-emitting device via the surface of the first layer, the surface of the first layer having a dielectric function that varies spatially according to a pattern; and

a phosphor material supported by the surface of the first layer,

wherein sidewalls of the light-emitting device are substantially devoid of the phosphor material.

2. The light-emitting device of claim 1, wherein the phosphor material is disposed on the surface of the first layer.

3. The light-emitting device of claim 1, wherein the light emitting device is packaged.

4. The light-emitting device of claim 1, wherein the light-emitting device is in the form of a packaged die.

5. The light-emitting device of claim 1, wherein the light-emitting device is in the form of a packaged device that is free of an encapsulant.

6. The light-emitting device of claim 1, further comprising a layer comprising a material that is substantially transparent to light that emerges from the light-emitting device.

7. The light-emitting device of claim 6, wherein at least some of the phosphor material is disposed within the layer that comprises the material that is substantially transparent to light that emerges from the light-emitting device.

8. The light-emitting device of claim 6, further comprising a material having an index of refraction of at most about 1.5 disposed between the surface of the first layer and the layer

that comprises the material that is substantially transparent to light that emerges from the light-emitting device.

9. The light-emitting device of claim 1, further comprising a support that supports the multi-layer stack of materials.

10. The light-emitting device of claim 9, further comprising a layer of reflective material that is capable of reflecting at least about 50% of light generated by the light-generating region that impinges on the layer of reflective material, the layer of reflective material being between the support and the multi-layer stack of materials.

11. The light-emitting device of claim 10, wherein the reflective material is a heat sink material.

12. The light-emitting device of claim 11, wherein the heat sink material is configured so that the heat sink material has a vertical heat gradient during use of the light-emitting device.

13. The light-emitting device of claim 10, further comprising a heat sink material.

14. The light-emitting device of claim 13, wherein the heat sink material is configured so that the heat sink material has a vertical heat gradient during use of the light-emitting device.

15. The light-emitting device of claim 1, further including a current-spreading layer between the first layer and the light-generating region.

16. The light-emitting device of claim 1, further comprising electrical contacts configured to inject current into the light-emitting device.

17. The light-emitting device of claim 16, wherein the electrical contacts are configured to vertically inject electrical current into the light-emitting device.

18. The light-emitting device of claim 1, wherein the light-emitting device is selected from the group consisting of light-emitting diodes, lasers, optical amplifiers, and combinations thereof.

19. The light-emitting device of claim 1, wherein the light-emitting device comprises a light emitting diode.

20. The light-emitting device of claim 1, wherein the light-emitting device is selected from the group consisting of OLEDs, flat surface-emitting LEDs, HBLEDs, and combinations thereof.

21. The light-emitting device of claim 1, wherein the pattern has an ideal lattice constant and a detuning parameter with a value greater than zero.

22. The light-emitting device of claim 1, wherein the pattern does not extend into the light-generating region.

23. The light-emitting device of claim 1, wherein the pattern does not extend beyond the first layer.

24. The light-emitting device of claim 1, wherein the pattern extends beyond the first layer.

25. The light-emitting device of claim 1, further comprising a layer of reflective material that is capable of reflecting at least about 50% of light generated by the light-generating region that impinges on the layer of reflective material,

wherein the light-generating region is between the layer of reflective material and the first layer.

26. The light-emitting device of claim 1, further comprising a layer of reflective material that is capable of reflecting at least about 50% of light generated by the light-generating

region that impinges on the layer of reflective material, wherein the light-generating region is between the layer of reflective material and the first layer.

27. The light-emitting device of claim 1, wherein the phosphor material is in the form of a layer, and a thickness of the layer of the phosphor material varies by less than about 20%.

28. The light-emitting device of claim 1, wherein the pattern is nonperiodic pattern or a complex periodic pattern.

29. A method of making a wafer, the method comprising:

disposing a phosphor material on a surface of the wafer, the wafer comprising:

a plurality of light-emitting devices, each light-emitting device including:

a multi-layer stack of materials including a light-generating region and a first layer supported by the light-generating region, a surface of the first layer being configured so that light generated by the light-generating region can emerge from the light-emitting device via the surface of the first layer, the surface of the first layer having a dielectric function that varies spatially according to a pattern.

30. The method of claim 28, wherein the phosphor material is disposed to form of a layer having a thickness that varies by less than about 20%.

31. The method of claim 30, further comprising flattening the layer of the phosphor material so that a thickness of the layer of the phosphor material varies by less than about 20%.

32. The method of claim 29, further comprising flattening the phosphor material after disposing the phosphor material on the surface of the first layer.

33. The method of claim 29, wherein the phosphor material is spin-coated on the surface of the wafer.

34. The method of claim 29, wherein the method includes forming a plurality of the light emitting devices from the wafer, and separating at least some of the light-emitting devices from each other.

35. The method of claim 29, wherein sidewalls of the light-emitting device are substantially devoid of the phosphor material.

36. A light-emitting device comprising:

a multi-layer stack of materials including a light-generating region and a first layer supported by the light-generating region, a surface of the first layer being configured so that light generated by the light-generating region can emerge from the light-emitting device via the surface of the first layer, the surface of the first layer having a dielectric function that varies spatially as a pattern; and

a phosphor material configured so that light generated by the light-generating region that emerges via the surface of the first layer interacts with the phosphor material so that light that emerges from the phosphor layer is substantially white light,

wherein a ratio of a height of the light-emitting device to an area of the light-emitting device is sufficiently small enough for the white light to extend in all directions.

37. A light-emitting device, comprising:

a multi-layer stack of materials including a light-generating region, and a first layer supported by the light-generating region, a surface of the first layer being configured so that light generated by the light-generating region can emerge from the light-emitting device via the surface of the first layer;

a first sheet comprising a material that is substantially transparent to light that emerges from the light-emitting device; and

a second sheet comprising a phosphor material, the second sheet being adjacent the first sheet,

wherein the light-emitting device is packaged, and the first and second sheets form a portion of the package for the light-emitting device.

38. The light-emitting device of claim 37, wherein a material having an index of refraction of less than about 1.5 is between the first sheet and the surface of the first layer.

39. The light-emitting device of claim 37, wherein the light-emitting device is free of an encapsulant material.

40. The light-emitting device of claim 37, wherein the surface of the first layer has a dielectric function that varies spatially according to a pattern.

41. The light-emitting device of claim 37, wherein the light-emitting device is in the form of a packaged die.

42. The light-emitting device of claim 37, wherein a gas is present between the multi-layer stack of materials and the first sheet.

43. The light-emitting device of claim 42, wherein the gas comprises air.

44. The light-emitting device of claim 42, wherein a pressure of the gas is less than about 100 Torr.

45. The light-emitting device of claim 37, wherein the first and second sheets are configured so that light generated by the light-generating region that emerges via the surface of the first layer can interact with the phosphor material, and so that light that emerges via the surface of the first layer and interacts with the phosphor material emerges from the cover as substantially white light.

46. The light-emitting device of claim 37, wherein the light-emitting device is free of an encapsulant material.